

McDonald

McDonald Overview

Volunteer monitoring began at Lake McDonald in 1996 and continued through 2004. The data indicate that this lake has decreased recently in primary productivity (eutrophic to mesotrophic); currently it has good water quality.

Lake McDonald has no public access boat launch, but residents should keep an eye on aquatic plants growing nearshore to catch early infestations of Eurasian milfoil or other noxious weeds.

Physical Parameters

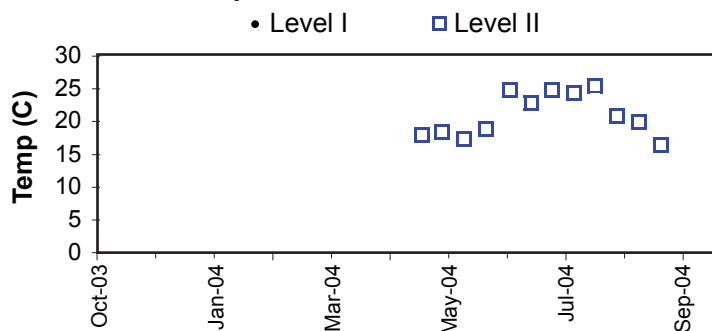
Secchi transparency ranged between 2.1 and 4.0 m from April through October, averaging 3.1 m which was mid range among the monitored small lakes in 2004. Water temperatures reached a maximum of 25.5 degrees Celsius which was in the upper mid range of values recorded for the group.

Fairly complete precipitation and water level records were available for 2004, showing that the lake level followed the common northwest pattern of winter high – summer low, with short term increases in level correlated with rainfall events.

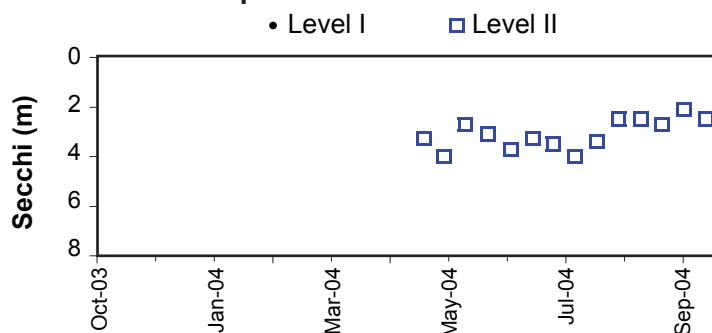
Nutrient Analysis and TSI Ratings

Total phosphorus and total nitrogen tracked each other closely through the sampling period, remaining fairly steady through the season. The N:P ratio ranged from 25 to 41, averaging 31 which suggested poor conditions for nuisance bluegreen growth at 1m depth.

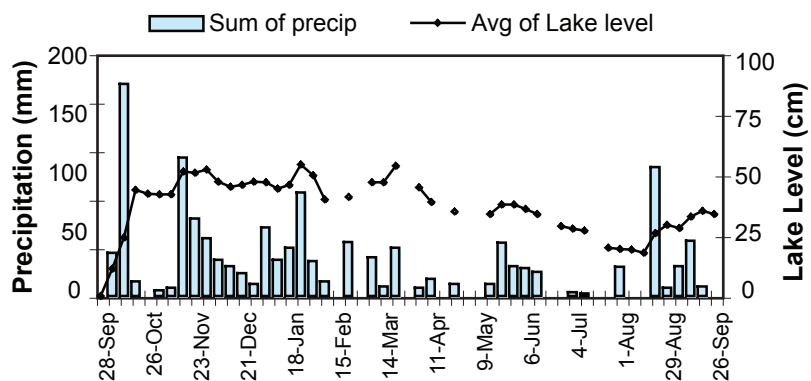
Lake Temperature



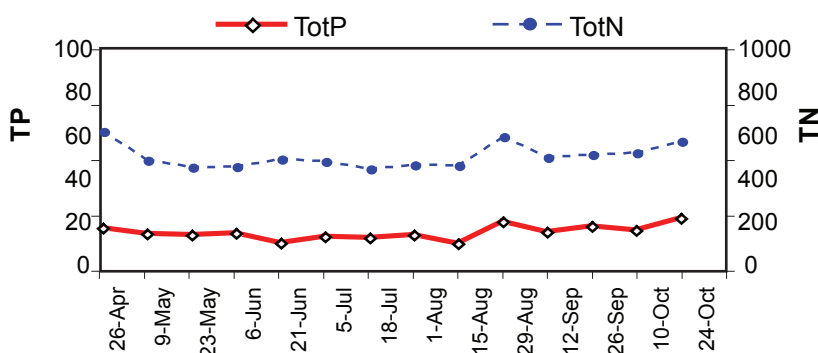
Secchi Depth



Lake Level and Precipitation



Nutrient Analysis



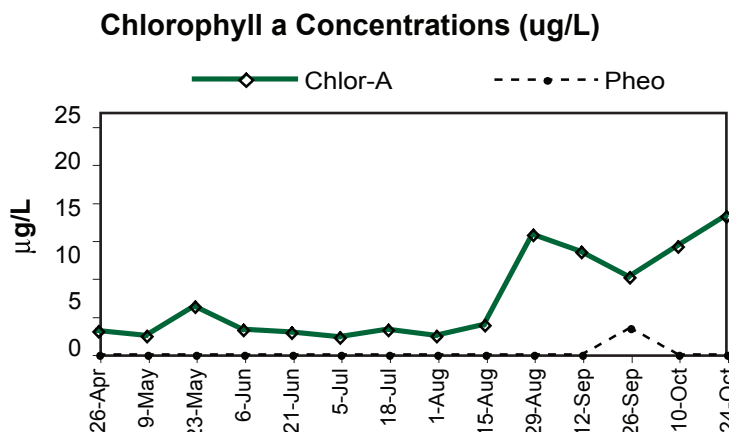
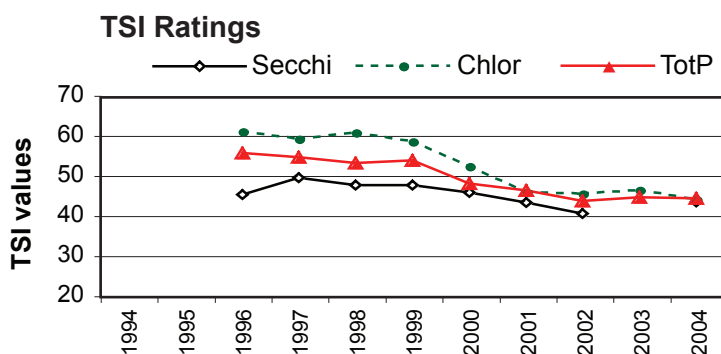
Profile data indicate that thermal stratification was present early in the season and persisted through the summer. Large concentrations of phosphorus built up in the deep water, indicating that release from the sediments was taking place. Chlorophyll data suggested that algae were evenly spread out through the upper water column during the season.

The 2004 TSI values were in close agreement with each other, similar to values in 2001 – 2003 and significantly below the values before 2001.

Chlorophyll Concentrations and Algae

Chlorophyll concentrations remained fairly low until mid August, when they rose to a higher level that was maintained through the end of the sampling season. The spring and summer communities were characterized by the bluegreen *Aphanizomenon flos-aquae* and an unidentified colonial chlorophyte. The fall community was dominated by the bluegreens *Anabaena* and *Aphanizomenon*, as well as the diatom *Tabellaria* and an unidentified chrysophyte taxon.

Date	Secchi	depth-m	degC	Chlor-A	TP µg/L	TN µg/L
5/23/04	2.7	1	17.5	4.97	16.0	471
		7	5.0	1.60	29.6	716
		13	5.0		216.0	799
8/29/04	2.5	1	21.0	12.40	22.1	608
		7	10.0	13.30	29.3	456
		13	5.5		447.0	1610



Common Algae

	Group
<i>Aphanizomenon flos-aquae</i>	Cyanobacteria
Unidentified colony	Chlorophyta
<i>Anabaena</i> sp.	Cyanobacteria

2004 Level I Data

* See introduction for discussion of algae assessment and goose count methods.

2004 Level II Data

Date (2004)	Temp (°C)	Secchi (m)	Chl-a (µg/l)	TP (µg/l)	TN (µg/l)	Algae Obsv.	N:P	Calculated TSI		
								Secc	chl-a	TP
26-Apr	18.0	3.3	2.40	19.1	630	2	33	42.8	39.2	46.7
9-May	18.5	4.0	1.90	16.7	501	1	30	40.0	36.9	44.8
23-May	17.5	2.7	4.97	16.0	471	2	29	45.7	46.3	44.1
6-Jun	19.0	3.1	2.56	16.8	474	3	28	43.7	39.8	44.9
21-Jun	25.0	3.7	2.24	12.5	506	2	40	41.1	38.5	40.6
5-Jul	23.0	3.3	1.80	15.3	497	2	32	42.8	36.3	43.5
18-Jul	25.0	3.5	2.56	14.8	463	2	31	41.9	39.8	43.0
1-Aug	24.5	4.0	1.90	16.0	480	1	30	40.0	36.9	44.1
15-Aug	25.5	3.4	3.04	12.1	479		40	42.3	41.5	40.1
29-Aug	21.0	2.5	12.40	22.1	608	3	28	46.8	55.3	48.8
12-Sep	20.0	2.5	10.60	17.5	514	3	29	46.8	53.7	45.4
26-Sep	16.5	2.7	8.01	19.9	528	2	27	45.7	51.0	47.3
10-Oct	NR	2.1	11.20	18.3	535	3	29	49.3	54.3	46.1
24-Oct	NR	2.5	14.30	23.7	586	2	25	46.8	56.7	49.8
	Temp (°C)	Secchi (m)	Chl-a (µg/l)	TP (µg/l)	TN (µg/l)	Algae	N:P	Calculated TSI		
								Secc	chl-a	TP
Mean	21.1	3.1	5.7	17.2	519.4	2.2	31	44.0	44.7	44.9
Median	20.5	3.2	2.8	16.8	503.5	2	30	43.2	40.6	44.8
Min	16.5	2.1	1.8	12.1	463.0	1	25	40.0	36.3	40.1
Max	25.5	4.0	14.3	23.7	630.0	3	40	49.3	56.7	49.8
Count	12	14	14	14	14	13	14	14	14	14

TSI Average = 44.5